

ATTITUDE OF URBAN AND RURAL ADOLESCENTS TOWARDS SCIENCE

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ABSTRACT

Scientific attitude is curiosity, rationality, and open-mindedness, seeking knowledge and expectation that solution of the problem will come out through the use of verified knowledge. The teacher bears the responsibility of developing scientific attitude among students. Without scientific attitude aims of science cannot be attained. Scientific attitude, now-a-days, is found to be lacking in every sphere of educational field. This is a hindrance in the path of acquiring knowledge. Scientific attitude is need of today's society for peaceful and meaningful living of every person in a multicultural world. The teachers and students need to have a scientific attitude. This study investigated the scientific attitude of urban and rural adolescents towards science. The survey research design was used to carry out the study. For the study, a sample of 490 adolescents from Coimbatore district of Tamil Nadu using stratified random sampling technique was used. In this study the investigator used self-made scientific attitude scale. The collected data were analyzed using the mean, standard deviation, t-test, F test and Chi-square test. It was revealed from the study that there is a significant difference between rural and urban adolescents in their attitude towards science.

Keywords: *Scientific attitude, curiosity, rationality and open mindedness*

INTRODUCTION

Today the educational scenario in India is meretricious. Our educational system aims education for all; but in reality majority of the students remain academically backwards their number is alarmingly high at all stages of Education. Some children needs special education compared to normal children. Teachers play an important role in modifying behavior of learners.

Education should allow children to reach their fullest potential in terms of cognitive, emotional and creative capacities. In 1990, the World Declaration on Education for all noted that the generally poor quality of education needed to be improved and recommended that education be made both universally available and more relevant. The purpose of education is to teach a student how to live his life, by developing his mind and equipping him to deal with reality, in which he has to be taught to think, to understand, to integrate the knowledge. Education in general sense is any act or experience that has a formative effect on the mind, character or physical ability of an individual. In its technical sense education is the process by which society deliberately transmits its accumulated knowledge, skills and values from one generation to another.

NSSE (National Society of the Study of Education) has defined scientific attitudes as “open mindedness, a desire for accurate knowledge, confidence in procedures for seeking knowledge and the expectation that the solution of the problem will come through the use of verified knowledge”.

A scientific attitude can be developed only through personal experience and keen observation in the process of science learning. The teacher will have to provide situations in the classroom or field environment where the students can experience, see, and feel the need for developing this attitude. For instance, open mindedness of the learners is necessary in scientific pursuits. They should respect others’ opinion but at the same time believe only in verified facts. The spirit of enquiry must prevail in a scientific pursuit. They should learn to observe and think critically and accurately. Accuracy and precision are essential in scientific experimentation. The purpose of scientific pursuit is to find the truth. There is no place for bias or prejudice if truth is to be revealed. The student’s observations, therefore, should be unbiased and objective. Intellectual honesty is indispensable in the study of science. While solving a problem, a scientist proceeds carefully and patiently, examines each step logically and holds back judgement until he is satisfied with the proof. These characteristics of any scientific pursuit should become a habit in the students learning science so that these are developed as a mental attitude in them. The

students of science must never believe in superstition or hearsay. They rely in cause and effect relationship and verified facts or proof (Das, 1985).

REVIEW OF RELATED LITERATURE

Research studies highlighted that there are many factors which are influenced by the scientific attitude. **Golwalkar, (1884)** Findings shows that there is significant relationship between government and private schools in relation to their scientific attitude.

Bhaskara Rao (1989) found that the pupils studying in private schools, rural schools, English medium schools and residential schools held relatively better scientific attitude than their counterparts.

Simsar and Ahmet (2018) finding shows that there were statistically significant relationships between Turkish children's attitudes towards science and their teachers' years of teaching experiences and frequency of teaching science in a week. The results also showed that Turkish children's success in other activities (language, art, math) related with their attitudes towards science. The findings also showed that using text books and hands-on activities during science education also had relationship with children's attitudes towards science.

Hacieminoglu and Esme (2016) findings showed that parents' income and education level had a significant effect on students' attitude toward science. **Sakariyau et al., (2016)** found that there was no significant difference between the attitude of male and female students towards science in Ogun State, Nigeria. **Paulmathi Lucas (2016)** also found that there is no significant difference between the scientific attitude of boys and girls of Secondary school students in Thane city.

Elizabeth et al., (2009) reported a study on attitude and interests among university students in introducing non major science courses. The major findings of the study are that the attitudes toward science may develop as early as middle school and often differ between genders. Do these gender differences in attitude persist into the college years? In a survey of 376 university students, male students reported a stronger self-concept, more motivation, and more

enjoyment of science than did female students, and female students reported more anxiety toward science than did male students.

OBJECTIVES OF THE STUDY

1. To find out the level of scientific attitude of adolescents.
2. To find out the scientific attitude of urban and rural adolescents with regard to the variables viz., Gender, Medium of instruction, Birth order, Type of the school, Qualification of parents, Occupation of parents and Family annual income
3. To find out of the difference in attitude of urban and rural adolescents towards science.

HYPOTHESES OF THE STUDY

1. There is no significant difference between male and female urban adolescents in their attitude towards science.
2. There is no significant difference between Tamil and English medium urban adolescents in their attitude towards science.
3. There is no significant difference among first, middle and last order urban adolescents in their attitude towards science.
4. There is no significant difference between urban adolescents studying in government and private schools in their attitude towards science.
5. There is no significant association between fathers' qualification of urban adolescents and their attitude towards science.
6. There is no significant association between mothers' qualification of urban adolescents and their attitude towards science.
7. There is no significant association between fathers' occupation of urban adolescents and their attitude towards science.
8. There is no significant association between mothers' occupation of urban adolescents and their attitude towards science.

9. There is no significant association between family annual income of urban adolescents and their attitude towards science.
10. There is no significant difference between male and female rural adolescents in their attitude towards science.
11. There is no significant difference between Tamil and English medium rural adolescents in their attitude towards science.
12. There is no significant difference among first, middle and last order rural adolescents in their attitude towards science.
13. There is no significant difference between rural adolescents studying in government and private schools in their attitude towards science.
14. There is no significant association between fathers' qualification of rural adolescents and their attitude towards science.
15. There is no significant association between mothers' qualification of rural adolescents and their attitude towards science.
16. There is no significant association between fathers' occupation of rural adolescents and their attitude towards science.
17. There is no significant association between mothers' occupation of rural adolescents and their attitude towards science.
18. There is no significant association between family annual income of rural adolescents and their attitude towards science.
19. There is no significant difference between urban and rural adolescents in their attitude towards science.

METHODOLOGY

Survey method was employed for the collection of data from the selected sample.

TOOL USED

In this study, self-made Scientific Attitude Scale, which is a rating scale to measure the scientific attitude of urban and rural adolescents was used.

SAMPLE OF THE STUDY

Stratified Random Sampling Technique was used to select the sample of the study from Government and Private schools. A sample of 490 adolescents from urban and rural area higher secondary schools in Coimbatore District were taken.

INTERPRETATION OF DATA

Table 1: DESCRIPTIVE ANALYSIS OF SCIENTIFIC ATTITUDE AMONG URBAN ADOLESCENTS

S. No.	Statistics	Data
1	Mean	154.63
2	Median	157
3	Mode	181
4	Standard Deviation	29.68
5	Skewness	-0.847
6	Kurtosis	0.789
7	Minimum	45
8	Maximum	205

The mean, median and mode value for scientific attitude scores of urban adolescents were found to be 154.63, 157 and 181 respectively. Also skewness and kurtosis were found to be -0.847 and 0.789 respectively.

Table 2: DESCRIPTIVE STATISTICS: DESCRIPTIVE ANALYSIS OF SCIENTIFIC ATTITUDE AMONG RURAL ADOLESCENTS

S. No.	Statistics	Data
1	Mean	168.90
2	Median	175
3	Mode	205

4	Standard Deviation	30.71
5	Skewness	-0.757
6	Kurtosis	-0.269
7	Minimum	83
8	Maximum	205

The mean, median and mode value for scientific attitude scores of urban adolescents were found to be 168.90, 175 and 205 respectively. Also skewness and kurtosis were found to be -0.757 and -0.269 respectively.

INFERENCEAL STATISTICS

Table 3: Level of Scientific attitude of adolescents (Locality wise)

Locality	Low		Moderate		High		Total
	Number	%	Number	%	Number	%	
Urban	42	14.19	205	69.26	47	15.88	296
Rural	38	19.59	128	65.98	30	15.46	194
Total	80	16.33	333	67.96	77	15.71	490

It is inferred from the above table that 14.19 % of the urban adolescents have low level of scientific attitude, 69.26 % of urban adolescents have moderate level of scientific attitude and 15.88 % of urban adolescents have high level of scientific attitude. It is also inferred from the above table that 19.59 % of the rural adolescents have low level of scientific attitude, 65.98 % of rural adolescents have moderate level of scientific attitude and 15.46 % of rural adolescents have high level of scientific attitude.

Figure1: Level of Scientific Attitude of Adolescents

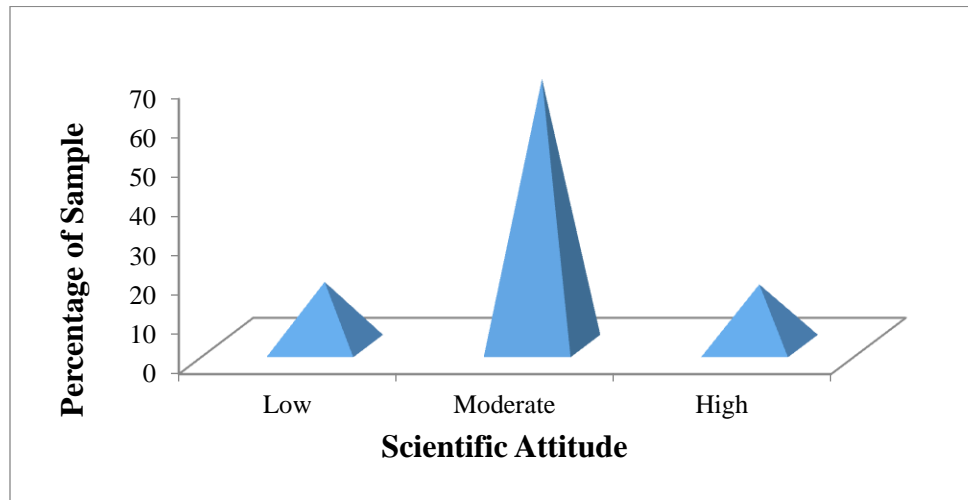


Table 4: Level of Scientific attitude of adolescents (Locality with Gender)

Locality	Gender	Low		Moderate		High		Total
		Number	%	Number	%	Number	%	
Urban	Male	32	20.92	102	66.67	19	12.42	153
	Female	16	11.19	103	72.03	24	16.78	143
Rural	Male	20	20.00	71	71.00	9	9.00	100
	Female	12	12.77	57	60.64	25	26.60	94
Total		80	16.33	333	67.96	77	15.71	490

It is inferred from the above table that the low, moderate and high scientific attitude of urban male adolescents were found to be 20.92, 66.67 and 12.42 % respectively. It is also inferred from the above table that the low, moderate and high scientific attitude of urban female adolescents were found to be 11.19, 72.03 and 16.78 % respectively.

The low, moderate and high scientific attitude of rural male adolescents were found to be 20, 71 and 9 % respectively. And also it shows that the low, moderate and high scientific attitude of rural female adolescents were found to be 12.77, 60.64 and 26.60 % respectively. In both urban and rural, the moderate scientific attitude adolescents were found to be maximum.

Null Hypothesis 1, 2 and 4

1. There is no significant difference between male and female urban adolescents in their attitude towards science. 2. There is no significant difference between Tamil and English medium urban adolescents in their attitude towards science. 4. There is no significant difference between urban adolescents studying in government and private schools in their attitude towards science.

TABLE 5: DIFFERENCE BETWEEN (i) MALE AND FEMALE (ii) TAMIL AND ENGLISH MEDIUM AND (iii) GOVERNMENT AND PRIVATE SCHOOLS OF URBAN ADOLESCENTS IN THEIR ATTITUDE TOWARDS SCIENCE

Variables	Subvariables	N	Mean	SD	t value	Remarks
Gender	Male	153	151.58	30.290	1.849	NS
	Female	143	157.94	28.816		
Medium of Instruction	Tamil	89	155.55	37.287	0.342	NS
	English	207	154.26	25.874		
Type of School	Government	165	154.67	32.598	0.016	NS
	Private	131	154.62	25.734		

(At 5% level of significance the table value of 't' is 1.96)

From the Table-5 clearly depicts that the calculated t values are less than the table value. Hence, there is no significant difference between the gender, medium of instruction and nature of school in their attitude towards science. Hence the null hypotheses 1, 2 and 4 are accepted.

Null Hypothesis 3

There is no significant difference among first, middle and last order urban adolescents in their attitude towards science.

TABLE 6: DIFFERENCE AMONG FIRST, MIDDLE AND LAST ORDER URBAN ADOLESCENTS IN THEIR ATTITUDE TOWARDS SCIENCE

Variable	Source of variation	Sum of squares	df	MS	F value	Remarks
Birth Order	Between Groups	2650.557	2	1325.279	1.507	NS
	Within Groups	257710.902	293	879.559		

(At 5% level of significance the table value of 'F' is 3.00)

It is inferred from the above Table-6 that the calculated 'F' value (1.507) for the scientific attitude of adolescents with respect to birth order is less than the table value (3.00). Therefore

the null hypothesis is accepted. Hence, there is no significant difference among first, middle and last order urban adolescents in their attitude towards science.

Null Hypothesis 5, 6, 7, 8 and 9

There is no significant association between (5) fathers’ qualification, (6) mothers’ qualification,(7) fathers’ occupation, (8) mothers’ occupation and (9) family annual income of urban adolescents and their attitude towards science.

TABLE 7: ASSOCIATION BETWEEN (i) FATHERS’ QUALIFICATION (ii) MOTHERS’ QUALIFICATION (iii) FATHERS’ OCCUPATION (iv) MOTHERS’ OCCUPATION AND (v) FAMILY ANNUAL INCOME OF URBAN ADOLESCENTS AND THEIR ATTITUDE TOWARDS SCIENCE

Variable	df	Calculated Chi Square value	Table Value	Remarks
Fathers’ Qualification	6	3.725	12.59	NS
Mothers’ Qualification	6	5.174	12.59	NS
Fathers’ Occupation	6	4.815	12.59	NS
Mothers’ Occupation	6	10.819	12.59	NS
Family Annual Income	6	18.675	12.59	S

From the above Table-7, it is inferred that there is no significant association between fathers’ qualification, mothers’ qualification, fathers’ occupation and mothers’ occupation of urban adolescents and their attitude towards science. Hence the hypothesis 5, 6, 7 and 8 are accepted.

But with regard to family annual income, it is inferred that the calculated chi square value (18.675) is greater than the table value (12.59) at 5 % level of significance. Therefore the null hypothesis is rejected. Hence there is a significant association between family annual income of urban adolescents and their attitude towards science.

Null Hypothesis 10, 11 and 13

(10) There is no significant difference between male and female rural adolescents in their attitude towards science. (11) There is no significant difference between Tamil and English medium rural adolescents in their attitude towards science, and (13) There is no significant difference between rural adolescents studying in government and private schools in their attitude towards science.

TABLE 8: DIFFERENCE BETWEEN (i) MALE AND FEMALE (ii) TAMIL AND ENGLISH AND (iii) GOVERNMENT AND PRIVATE RURAL ADOLESCENTS IN THEIR ATTITUDE TOWARDS SCIENCE

Variables	Subvariables	N	Mean	SD	t value	Remarks
Gender	Male	100	160.06	30.006	4.234	S
	Female	94	177.97	28.831		
Medium of Instruction	Tamil	110	177.75	26.101	4.958	S
	English	84	156.93	32.387		
Type of School	Government	137	176.09	27.119	5.554	S
	Private	57	151.07	31.838		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above Table-8 that the calculated 't' value for the gender, medium of instruction and type of school are 4.234, 4,958 and 5.554 respectively, which are greater than the table value (1.96) at 5% level of significance. Therefore the null hypothesis is rejected. Hence, there is a significant difference between male and female, Tamil and English medium, and Government and Private school rural adolescents in their attitude towards science.

Null Hypothesis 12

There is no significant difference among first, middle and last order rural adolescents in their attitude towards science.

TABLE 9: DIFFERENCE AMONG FIRST, MIDDLE AND LAST ORDER RURAL ADOLESCENTS IN THEIR ATTITUDE TOWARDS SCIENCE

Variable	Source of variation	Sum of squares	df	MS	F value	Remarks
Birth Order	Between Groups	1229.345	2	614.672	0.650	NS
	Within Groups	180746.248	191	946.315		

(At 5% level of significance the table value of 'F' is 3.00)

It is inferred from the above Table-9 that the calculated 'F' value (0.650) for the scientific attitude of adolescents with respect to birth order is less than the table value (3.00). Therefore the null hypothesis is accepted. Hence, there is no significant difference among first, middle and last order rural adolescents in their attitude towards science.

Null Hypothesis 14, 15, 16, 17 and 18

There is no significant association between (14) father's qualification,(15) mother's qualification, (16) father's occupation, (17) father's occupation,and (18) family annual income of rural adolescents and their attitude towards science.

TABLE 10: ASSOCIATION BETWEEN (i) FATHERS' QUALIFICATION (ii) MOTHERS' QUALIFICATION (iii) FATHERS' OCCUPATION (iv) MOTHERS' OCCUPATION AND (v) FAMILY ANNUAL INCOME OF RURAL ADOLESCENTS AND THEIR ATTITUDE TOWARDS SCIENCE

Variable	Df	Calculated Chi Square value	Table Value	Remarks
Fathers' Qualification	6	3.502	12.59	NS
Mothers' Qualification	6	6.238	12.59	NS
Fathers' Occupation	6	34.660	12.59	S

Mothers' Occupation	6	33.942	12.59	S
Family Annual Income	4	3.378	9.49	NS

From the above Table-10, it is inferred that there is no significant association between fathers' qualification, mothers' qualification and family annual income of rural adolescents and their attitude towards science. Therefore the null hypotheses 14, 15 and 18 are accepted. Hence there is no significant association between father's qualification, mothers' qualification and family annual income of rural adolescents and their attitude towards science.

It is also inferred that the calculated chi square values for fathers' occupation and mothers' occupation are 34.660 and 33.942, which are greater than the table value (12.59). Therefore the null hypothesis is rejected. Hence, there is a significant association between (16) fathers' occupation, and (17) mothers' occupation of rural adolescents and their attitude towards science.

Null Hypothesis 19

There is no significant difference between urban and rural adolescents in their attitude towards science.

TABLE 11: DIFFERENCE BETWEEN RURAL AND URBAN ADOLESCENTS IN THEIR ATTITUDE TOWARDS SCIENCE

Dimension	Variable	N	Mean	SD	t value	Remarks
Scientific Attitude	Urban	296	154.65	29.708	5.066	S
	Rural	194	168.74	30.706		

(At 5% level of significance the table value of 't' is 1.96)

It is inferred from the above Table-11 that the calculated 't' value(5.066) for scientific attitude of adolescents with respect to locality is greater than the table value. Therefore the null hypothesis is rejected. Hence, there is a significant difference between urban and rural adolescents in their attitude towards science.

RESULTS AND DISCUSSION

MAJOR FINDINGS OF THE STUDY

The result showed that 16.33 % adolescents have low level of scientific attitude, 67.96 % adolescents have moderate scientific attitude and 15.71 % adolescents have high scientific attitude. In both urban and rural, the moderate scientific attitude adolescents were found to be maximum.

Based on the null hypotheses testing the investigation shows that:

1. There is no significant difference between male and female urban adolescents in their attitude towards science.
2. There is no significant difference between Tamil and English medium urban adolescents in their attitude towards science.
3. There is no significant difference among first, middle and last order urban adolescents in their attitude towards science.
4. There is no significant difference between urban adolescents studying in government and private schools in their attitude towards science.
5. There is no significant association between fathers' qualification of urban adolescents and their attitude towards science.
6. There is no significant association between mothers' qualification of urban adolescents and their attitude towards science.
7. There is no significant association between fathers' occupation of urban adolescents and their attitude towards science.
8. There is no significant association between mothers' occupation of urban adolescents and their attitude towards science.

9. There is a significant association between family annual income of urban adolescents and their attitude towards science.
10. There is a significant difference between male and female rural adolescents in their attitude towards science.
11. There is a significant difference between Tamil and English medium rural adolescents in their attitude towards science.
12. There is no significant difference among first, middle and last order rural adolescents in their attitude towards science.
13. There is a significant difference between rural adolescents studying in government and private schools in their attitude towards science.
14. There is no significant association between fathers' qualification of rural adolescents and their attitude towards science.
15. There is no significant association between mothers' qualification of rural adolescents and their attitude towards science.
16. There is a significant association between fathers' occupation of rural adolescents and their attitude towards science.
17. There is a significant association between mothers' occupation of rural adolescents and their attitude towards science.
18. There is no significant association between family annual income of rural adolescents and their attitude towards science.
19. There is a significant difference between rural and urban adolescents in their attitude towards science.

RECOMMENDATIONS

(i) In order to increase the scientific attitude of adolescents, various teaching strategies should be adopted in schools related to their science curriculum. (ii) Educational institutions should provide opportunity to the adolescents to enrich their scientific attitude. (iii) ICT teaching processes should be incorporated with science subjects teaching methods. (iv) Latest inventions in science and technology should be frequently updated in curriculum and syllabus, and (v) In-service training to teachers should be frequently offered to update teachers' knowledge.

CONCLUSION

Scientific attitude of adolescents must be tested and the weaker dimension of scientific attitude must be identified. The investigators, during the study, observed variations in scientific attitude between urban and rural adolescents. The investigators suggest that a common general science curriculum based on scientific facts and new inventions must be compulsory even at higher levels of study and training as it will contribute to the development of scientific attitude of adolescents.

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